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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/730,941	12/10/2003	Jae Suk Lee	021906-0306952	6290

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EXAMINER	
LANDAU, MATTHEW C	
ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/730,941	LEE, JAE SUK	
	Examiner	Art Unit	
	Matthew Landau	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 October 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) *8-12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Claims 8-12 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on July 18, 2005.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4, and 7 are rejected under 35 U.S.C. 102(e) as being anticipated by Callegari et al. (US Pat. 6,664,186, hereinafter Callegari).

Regarding claims 1, 2, 4, and 7, Figure 28 of Callegari a dielectric pattern 83 formed on a surface of a silicon substrate 30 (col. 14, lines 59 and 60); a first Ru layer 32 (col. 15, lines 9-13) formed on the dielectric pattern; an oxide film 33 (RuO_x) (col. 15, lines 16-19) formed in a surface region of the first Ru layer; a second Ru layer 35 (col. 15, lines 39-42) formed on the oxide film; and a Cu layer 82 (col. 15, line 66 – col. 16, line 1) formed on the second Ru layer. The limitation "formed by oxidizing an upper part of the first Ru layer" is merely a product-by-process limitation that does not structurally distinguish the claimed invention over the prior art. The patentability of a product does not depend on its method of production. If the product in the

product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966. Further regarding claim 4, the product-by-process limitation "formed by a plasma treatment using N_2O or O_2" does not structurally/patentably distinguish the claimed invention over Callegari. Regarding claim 7, the above device must be made by the claimed method.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Callegari.

Regarding claim 3, the limitation "the first Ru layer and the second Ru layer are formed by using a sputtering or CVD (chemical vapor deposition)" is merely a product-by-process limitation that does not structurally distinguish the claimed invention over the prior art. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966. The difference between Callegari and the claimed invention is the first and second layers have a thickness in a range from about 80 angstroms to about 120 angstroms.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Callegari by using the claimed range, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Callegari.

Regarding claim 5, the product-by-process limitation "obtained by oxidizing an upper part of the first Ru layer" does not structurally/patentably distinguish the claimed invention over the prior art. The difference between Callegari and the claimed invention is the thickness of the oxide film is about 250 angstroms. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Callegari by using the claimed range, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Callegari in view of Zurcher et al. (US Pat. 6,344,413, hereinafter Zurcher).

Regarding claim 6, the difference between Callegari and the claimed invention is the ratio of x:y = 1:2 (Ru_xO_y). Figure 7 of Zurcher discloses a capacitor electrode 70 made of RuO_2 (col. 3, lines 17-23). Note that the RuO_x film 33 shown in Figure 28 of Callegari is also a capacitor electrode. In view of such teaching, it would have been obvious to the ordinary artisan at the

time the invention was made to modify the invention of Callegari to use the stoichiometry of RuO_2 (wherein x:y = 1:2) as taught by Zurcher, since RuO_2 is the most readily formed and stable stoichiometry for ruthenium oxide.

Response to Arguments

Applicant's arguments filed October 26, 2005 have been fully considered but they are not persuasive.

Applicant argues regarding Callegari that "a dielectric layer 34 is inserted between a bottom electrode 33 and a top electrode 35, whereas such a dielectric layer is not included in the barrier structure of claims 1 and 7". Simply because a reference has an additional element not recited in the claim does not mean anticipation of the claim is precluded. As explained in the above rejection, Callegari discloses all the limitations of claims 1 and 7. Note that the recitation "a barrier structure" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). Even if the above recitation were placed in the body of the claim, it would not structurally distinguish the claimed invention over Callegari. A layer of Ru inherently inhibits diffusion of copper. Therefore, any structure including Ru layers (such as that disclosed by Callegari) can be considered a barrier

structure. Furthermore, Callegari specifically discloses that layer 32 (the first Ru layer) is a barrier layer (col. 15, line 9).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

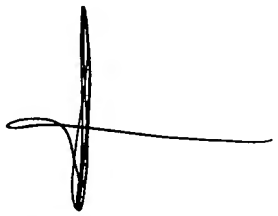
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew C. Landau whose telephone number is (571) 272-1731.

The examiner can normally be reached from 8:30 AM - 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone numbers for the organization where this application

or proceeding is assigned are (571) 273-8300 for regular communications and (571) 273-8300 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should any questions arise regarding access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KENNETH PARKER
SUPERVISORY PATENT EXAMINER

Matthew C. Landau

December 27, 2005